Engine and Auxiliary Systems

Edited by
Prof. Dr. A.K.M. Mohiuddin

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Chapter 22

Comparison between composites reinforced with natural and synthetic fibers: Part I

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Abstract

In this chapter, a detail description of fabrication of jute/epoxy, glass/epoxy, and jute/glass/epoxy hybrid composite is given. Overall procedures and methods are discussed in details before conducting the mechanical tests.

Introduction

The use natural plant fibers as reinforcement in polymer composites for making low cost engineering materials has generated much interest in recent years. New environmental legislation as well as consumer pressure has forced manufacturing industries particularly automotive, construction and packaging to search for new materials that can substitute for conventional non-renewable reinforcing materials such as glass fiber.

The use of natural fibers as a mechanical reinforcement material in place of fiber glass for thermoplastic and thermoset composites has many advantages. In addition to their lower cost and lower density, natural fibers are a renewable material and are less energy intensive to produce or grow than glass fibers. Furthermore glass fibers are abrasive to tooling which it is increasing maintenance costs and can cause irritation and discomfort to operators, two additional benefits that natural fibers may provide. The reduction in fiber density, and thus composite density, is especially favorable for automotive application, where vehicle weight and fuel economy are often concerns. Previous work also indicates that in some cases the substitution of natural fibers for glass fibers can also lead to improved material damping characteristics. The damping behavior of composite materials for automotive applications is an extremely important factor in overall vehicle NVH (noise, vibration, and harshness) performance.